

CLAIM AMENDMENTS

1 1. (original) A method for hyperpolarizing atomic
2 nuclei through optical pumping in a test cell, whereby polarization
3 of an electron spin of an optically pumpable species in a mixture
4 created by means of a laser light is transferred to the nuclear
5 spin of an atom to be hyperpolarized, characterized in that
6 components of the mixture and/or for the hyperpolarization of
7 inert compounds are guided into the test cell such that the mixture
8 does not ~~or only to a slight degree~~ touch the inner walls of the
9 test cell.

1 2. (currently amended) [[A]] The method according to
2 Claim 1 characterized in that the mixture is inclined in the
3 direction of flow, especially at a 45° angle to the side wall, when
4 guided into the test cell.

1 3. (currently amended) [[A]] The method according to
2 Claim 1 [[or 2]], characterized in that the mixture with optically
3 pumpable species and nuclei to be hyperpolarized is guided as a
4 free beam into the test cell.

1 4. (currently amended) [[A]] The method according to
2 any of the previous claims claim 1, whereby a bypass flow

3 consisting of a compound for the separation of the mixture from the
4 inner walls is guided into the test cell.

1 5. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, characterized in that the laser
3 light is radiated into the test cell perpendicularly to the
4 direction of flow of the mixture flowing in the test cell.

1 6. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, characterized in that the laser
3 light is radiated into the test cell in a counter current to the
4 direction of flow of the mixture flowing in the test cell.

1 7. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, characterized in that the
3 mixture is disengaged at the point where the intensity of the laser
4 is largest.

1 8. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, characterized in that the walls
3 of the test cell are cooled.

1 9. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, characterized in that the spin

3 exchange is transferred indirectly via a non-optically pumpable
4 species to the nuclear spin of a nucleus to be hyperpolarized.

1 10. (currently amended) [[A]] The method according to
2 ~~any of the previous claims~~ claim 1, whereby ¹²⁹Xe, ³He or ¹³CO₂ are
3 hyperpolarized.

1 11. (currently amended) An apparatus device for
2 implementing [[A]] the method according to ~~any of the previous~~
3 ~~claims~~ claim 1 [[to 10]], characterized by at least one means
4 [[feeds]] for feeding into the test cell the components of the
5 mixture out of optically pumpable species and hyperpolarizable
6 nuclei and/or other compounds inert to hyperpolarization such that
7 the mixture does not touch ~~or only slightly touches~~ the inner walls
8 of the test cell.

1 12. (currently amended) The device apparatus according
2 to claim 11, characterized in that the inlet and/or outlet forms a
3 predetermined angle to the longitudinal axis of the test cell, in
4 particular 45°.

1 13. (currently amended) The apparatus according to one
2 ~~of claims~~ claim 11 [[or 12]], [[cit]] characterized in that at
3 least one nozzle is the means.

1 14. (currently amended) The apparatus according to one
2 ~~of preceding claims~~ claim 11 [[to 13]], characterized in that the
3 means forms a free column for injecting the mixture into the test
4 cell.

1 15. (currently amended) The apparatus according to one
2 ~~of preceding claims~~ claim 11 [[to 14]], characterized in that the
3 means is a surrounding stream for the mixture.

1 16. (currently amended) The apparatus according to one
2 ~~of preceding claims~~ claim 11 [[to 15]], characterized in that at
3 least one laser is set such that the laser beam is oriented
4 perpendicular and/or countercurrent to the flow of the mixture in
5 the test cell.

1 17. (currently amended) The apparatus according to one
2 ~~of preceding claims~~ claim 11 [[to 16]], characterized in that the
3 input window or windows of the test cell have for the laser beam
4 the greatest possible spacing from the input of the test cell for
5 the optically pumpable species.

1 18. (currently amended) The apparatus according to one
2 ~~of claims~~ claim 11 [[to 17]], characterized by the provision of at
3 least one supply container for a chemical species.

1 19. (currently amended) The apparatus according ~~one of~~
2 ~~preceding claims~~ claim 11 [[to 18]], characterized in that the
3 supply container is mounted in the supply line(s) of the apparatus.

1 20. (currently amended) The apparatus according to ~~one~~
2 ~~of preceding claims~~ claim 11 [[to 19]], characterized by means for
3 cooling walls of the test cell.